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(54) Replaceable nose member for chain saw guide bars

(57) A chainsaw guide bar includes a bar body (B) and a nose member (N) removably attached to the bar body (B) by an elastic snap-in coupling, eliminating the need for separate fastening elements. A force for disengaging the snap-in coupling is greater than a force required to engage the snap-in coupling. The elastic deformation of spring portions of the snap-in coupling can occur in the thickness direction of the guide bar, or in the plane of the guide bar.

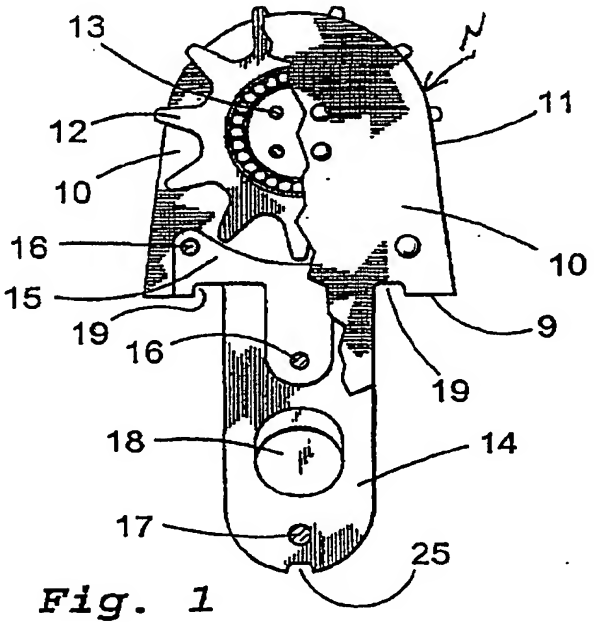

Fig. 1

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Description

Background of the Invention

[0001] The present invention relates to chain saw guide bars and, in particular, to a replaceable nose member for a chain saw guide bar.

[0002] It is well known in the prior art to provide chain saw guide bars with separate nose members, because the nose member preferably has a considerably different structure as compared to the body of the guide bar. That is, a nose member is more dependable if made from a number of thinner plates which have smooth contact surfaces bearing against a nose sprocket, or against a nose wheel and its bearing parts, whereas the body of the guide bar is stronger and stiffer if it is made from one thick plate rather than a number of thinner plates welded, riveted or laminated together.

[0003] It is also an advantage to be able to replace a nose member since the nose sprocket or its bearing is worn out or damaged in service more often than the guide bar body. The nose member is therefore commonly made as a separate item which can be slid into place and fastened to the guide bar body.

[0004] The saw chain can be fractured in service if it encounters nails or other hard objects, and may then fall off. To avoid losing the nose member in case the chain falls off, it has been traditional to attach the nose member to the guide bar body by rivets as disclosed in U.S. Patent No. 596,802 and later patents. When the nose member is to be replaced, the rivets have to be removed by drilling, and other rivets have to be set to attach a new nose member. Consequently, exchange of such a nose member cannot be done in the field. A tight attachment will also reduce vibrations and noise, and preserve the continuity of the peripheral groove.

[0005] Alternative fastening methods have been suggested, such as attaching the nose member by a rotatable claw or other reusable element as in U.S. Patent No. 4,956,918. Holding the nose member in place by a tight press fit was suggested in U.S. Patent No. 2,693,206. Press fit as well as screws have found very little practical application, since the extreme vibrations tend to loosen such connections and make them unreliable. An elastic wedge-shaped center plate was suggested in CA 493,111, but will be extremely sensitive to vibrations, since the wedge action will make the force needed to release the nose member much smaller than the force needed to mount it.

Summary of the Invention

[0006] The present invention involves attaching a replaceable nose member to a guide bar body by a snap-in coupling, requiring no parts such as fasteners, that could be lost or loosened by vibration, while allowing replacement of a nose member in the field using no tools more complicated than a screwdriver.

Brief Description of the Drawings

[0007] Preferred embodiments of the invention will be described below with reference to the figures, where

Fig. 1 shows a partially broken-away view of a replaceable nose member according to the invention;
Fig. 2 shows the front end of a guide bar body onto which the replaceable nose member can be attached;
Fig. 3 shows a longitudinal section through the replacement nose member of Fig. 1;
Fig. 4 is a view similar to Fig. 3 showing the nose member attached to a guide bar body;
Fig. 5 is a view similar to Fig. 1 of a second embodiment of a replaceable nose member;
Fig. 6 is a view similar to Fig. 2 of a second embodiment of a guide bar body; and
Fig. 7 is a view similar to Fig. 4 showing the second nose member embodiment attached to the second guide bar body.

Detailed Description of Preferred Embodiments of the Invention

[0008] A first embodiment of the invention is depicted in Figs. 1-4. A replaceable nose member N according to the invention comprises two side plates (10) having a front contour (11) and a width and direction such that a saw chain running along the guide bar will transfer to the nose member without any impact or loss of guidance. Between the side plates is a rotatable sprocket (12) rotatable on a roller bearing having an inner race fastened to the side plates by rivets (13). The rear ends of the side plates are made as tongues (14) having a smaller width than the front region of the side plates or the guide bar body. Concave corners (19) are formed on a rear transverse edge (9) of the wider front region. Between the sprocket and the tongues is a middle plate (15). The width of the middle plate is smaller than the width of the side plates, to allow drivelinks of the saw chain to enter between side plates. The middle and side plates are held together with rivets (16) or spot welds. The rearmost part of the tongues may be held at proper distance by a rivet (17).

[0009] Fig. 2 shows the front end of a guide bar body B according to the invention, with two longitudinal edges (20) along which the saw chain will run with drive links in a groove along the edges, and with milled recesses (21) on both flat sides to receive the tongues (14) of the nose member. Between the milled recesses, the base material remains as a web (22) with a thickness corresponding to the thickness of the middle plate (15). The web is preferably made with a slot (23) to simplify mounting of a new nose member by accommodating the rivet (17) and the rearmost rivet (16). The rear end (23a) of the slot 23 narrows in width and receives the rivet (17).

[0010] The recesses (21) and the tongues (14) are

made with similar shape and dimensions to make it possible to slide the nose member off or onto the guide bar body, with the tongues basically filling the recesses. There should, however, be some elastically deformable portion of the web (22) or the tongues (14) or both, cooperating to offer more resistance when the tongues are nearly filling the recesses, especially resistance against sliding the nose member off the guide bar body. If the elastically deformable portion is to be a portion of the tongues (14), then the rivets (16,17) through the tongues should be far apart to provide enough elasticity.

[0011] One embodiment of this is shown in Figs. 2 and 3, where elastic deformation occurs in the thickness direction of the guide bar (i.e., perpendicularly to a plane of the nose member), the deformation occurring particularly in the tongues (14). The web (22) is provided with a cutout (24) which may be connected to the slot (23). The tongues are made with indentations (18) corresponding to the cutout. The indentations are located at such a distance from the rivets (16,17) that the tongues may be bent elastically apart by the web to make room for the thickness of the web. Eventually, the tongues snap back into the cutouts (24) to create a snap-in coupling (see Fig. 4). The indentations are made with sloping sides (31, 32) such that they will be pried apart when the indentations (18) are forced to move relative to the cutout (24). The force needed to do that depends on the degree of slope, and by choosing a steeper slope at the front side (31) and a gentle slope at the rear side (32) it is ensured that the initial force to move the nose member off the guide bar body B is so much higher than the force needed to slide a new nose member onto the guide bar body B, that there is no risk of the nose member falling off in case the chain breaks.

[0012] Another embodiment of the invention is shown in Figs. 5-7, where elastic deformation occurs in the plane of the guide bar, particularly in the web. The sides of the slot (123) are provided with elastic oblique teeth (141) locally making the slot narrower. When the nose member N' is slid onto the guide bar body B', the rearmost rivet (17) will push the teeth apart. The longitudinal force required to do so being low because of the gently sloping sides (142) of the teeth. After the rivet (17) passes the teeth, the teeth (141) will snap back, capturing the rivet (17) as shown in phantom lines in Fig. 6 and in solid lines in Fig. 7. When the nose member is to be removed from the guide bar body, the steeper rear ends (143) of the teeth bear against the rivet and require a distinctly higher force to be pried apart, ensuring that there is no risk of the nose member falling off in case the chain breaks.

[0013] As was shown in U.S. Patent No. 2,693,206, if a replaceable nose member is slidingly fitted to a guide bar body and held by strong frictional forces, one preferable way to remove the nose member is to pry the nose member with an elongated tool such as a screwdriver or an awl that is inserted through an open hole disposed between the nose member and the bar body, the open hole formed by one or more cutouts in the contour where the side plates of the nose member meet the surface of the bar body. Preferred locations for such holes are at the rear end (25) of the tongues (14) of the side plates, and at the corners (19) where the tongues diverge from the transversal border (9) of the wider front region. The present invention has a great advantage compared to the 2,693,206 patent, in that the strong frictional force only applies to a minor portion of the length that the nose member must slide to become free from the bar body; in contrast, a press fit along the whole length of the tongues would require a strong force along the whole length, with more requirement of auxiliary tools and waste of time.

[0014] There are several obvious variations of these embodiments. Concerning elastic deformation in the thickness direction, the elastic indentations may be located in the web (instead of in the nose member) to cooperate with cutouts in the tongues. Concerning elastic deformation in the plane of the guide bar, the elastic teeth may comprise parts of the middle plate of the nose member and designed to snap onto projections disposed on the walls of the slot. By choosing suitable angles for the indentations and teeth, the initial force needed for removal of the nose member can be made noticeably higher than the force needed for mounting a new nose member, or for the later stage of removal.

[0015] It would also be possible according to the invention to provide the side plates (10) with elastic tongues snapping into lateral notches formed in the web (22) but that would in many applications make the tongues more exposed to damage from the cut wood or other external objects. It is possible, however, to choose such angles for a tongue that the initial force is so high that it is virtually locked, unless it is slightly lifted or released by a tool such as a screwdriver inserted through a hole in the opposite side plate.

[0016] Another possible variation is that a nose member mounted and held by one of the above-described elastic spring actions can be afterwards locked in place with an easily removable rivet of a softer material such as aluminum.

[0017] Although the present invention has been described in connection with preferred embodiments thereof, it will be appreciated by those skilled in the art that additions, deletions, modifications, and substitutions not specifically described may be made without departing from the spirit and scope of the invention as defined in the appended claims.

Claims

1. Chainsaw guide bar comprising a guide bar body and a replaceable nose member, the nose member having two rearward tongues spaced apart in a thickness direction of the nose member, and the body having a web which fits between the tongues,

wherein the nose member is held in place by an elastic snap-in coupling between elastically deformable spring portions of one of the members and rigid portions of the other member, wherein the nose member is slidable into place and out of place without adding or removing any fastener element.

2. Chainsaw guide bar according to claim 1, wherein the elastic snap-in coupling is configured to cause a force required to elastically disengage the snap-in coupling to be greater than a force required to elastically engage the snap-in coupling.

3. Chainsaw guide bar according to claim 1, wherein the spring portions are deformable in a thickness direction of the guide bar and carry raised regions, and wherein the rigid portions comprise edges of cutouts.

4. Chainsaw guide bar according to claim 1, wherein each of the raised regions is formed on one side of the respective spring portion and coincides with an indentation formed in an opposite side of the respective spring portion.

5. Chainsaw guide bar according to claim 3, wherein each raised region has a first slope facing the edge of the respective cutout when the nose member is in place and a gentler second slope facing the other member while sliding the nose member into place.

6. Chainsaw guide bar according to claim 3, wherein the spring portions comprise portions of the sprocket nose tongues, and the rigid portions comprise cutouts in the web of the guide bar body.

7. Chainsaw guide bar according to claim 4, wherein the spring portions comprise portions of the sprocket nose tongues, and the rigid portions comprise cutouts in the web of the guide bar body.

8. Chainsaw guide bar according to claim 5, wherein the spring portions comprise portions of the sprocket nose tongues, and the rigid portions comprise cutouts in the web of the guide bar body.

9. Chainsaw guide bar according to claim 1, wherein the spring portions are elastically deformable in a plane of the guide bar.

10. Chainsaw guide bar according to claim 9, wherein the spring portions comprise hook-shaped projections projecting from the web of the guide bar body in the plane of the guide bar.

11. Chainsaw guide bar according to claim 1, wherein at least one through-hole is formed in the guide bar at an interface between the side plates and the bar body for receiving a prying tool.

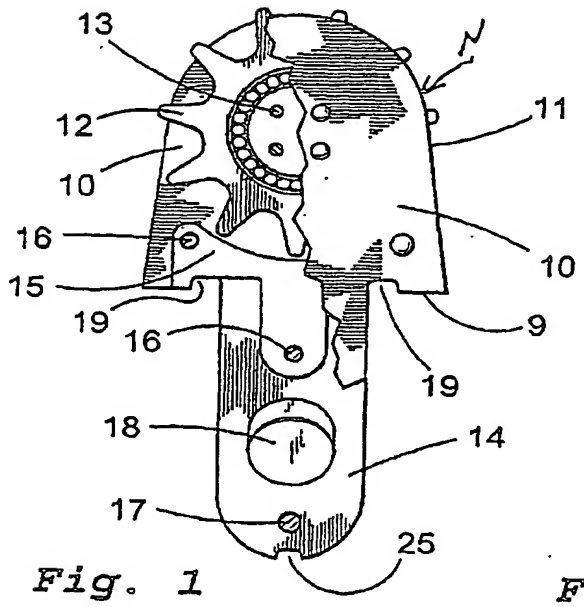

Fig. 1

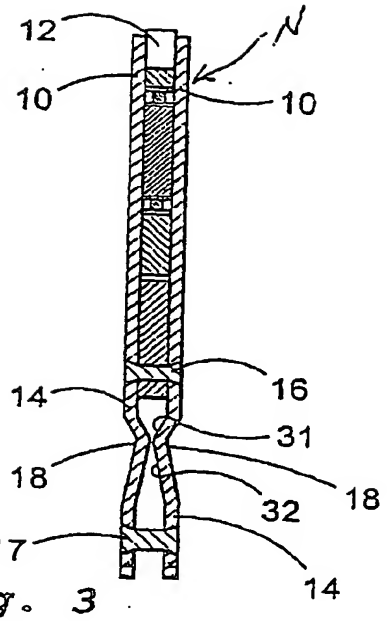

Fig. 3

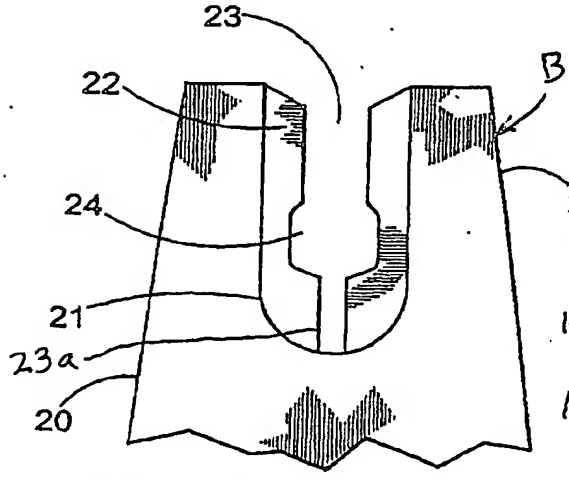

Fig. 2

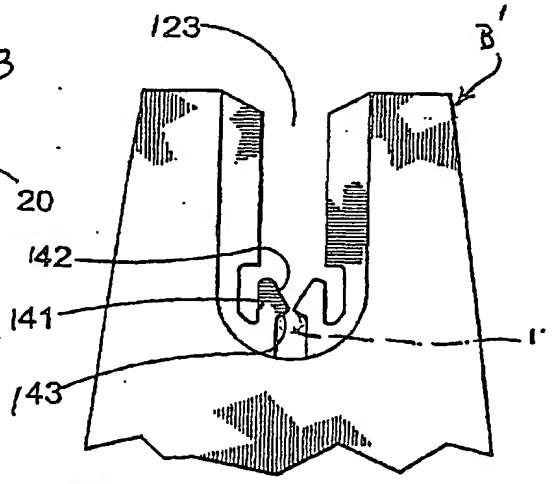

Fig. 6

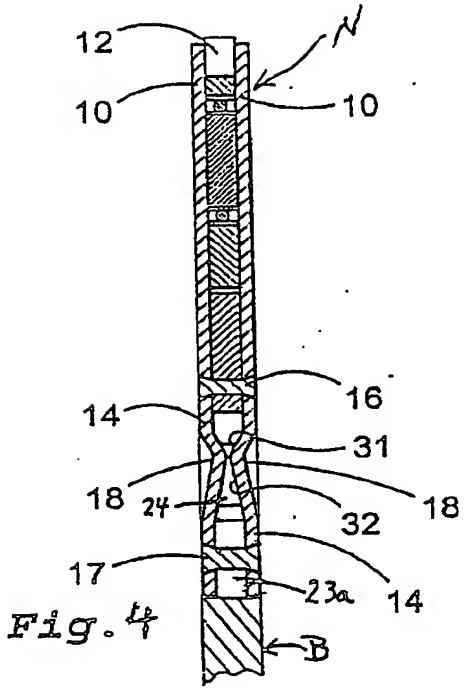

Fig. 4

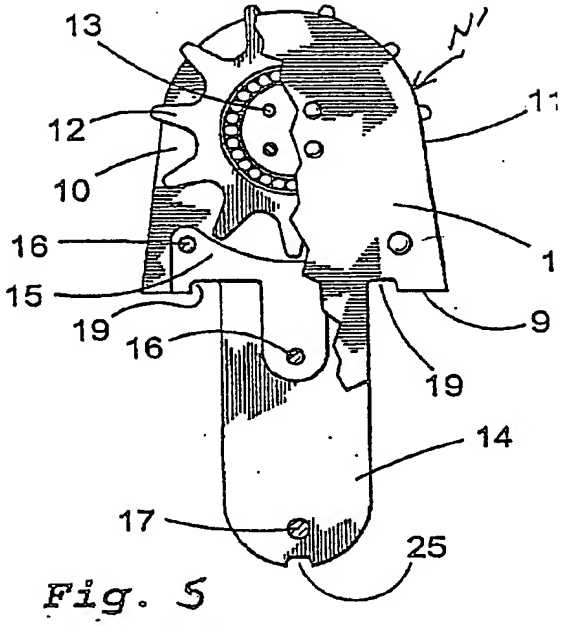

Fig. 5

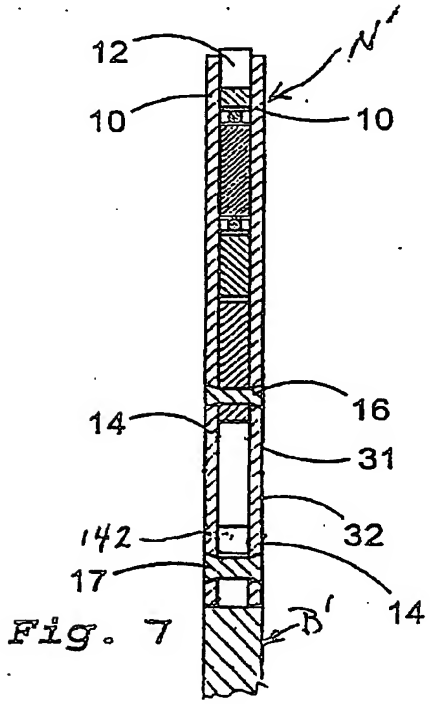

Fig. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 85 0126

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 October 2001	Rijks, M

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